LESSON 15: Nuclear Reactions and LESSON 16: Formation of Elements

52. Write a nuclear equation showing each of the following isotopes emitting a beta particle.

a. potassium-42

$^{42}_{19}K \rightarrow {}^{0}_{-1}B + {}^{42}_{20}Ca$ (PARENT → DAUGHTER)

b. barium-136

$^{136}_{56}Ba \rightarrow {}^{0}_{-1}B + {}^{136}_{57}La$ (PARENT → DAUGHTER)

53. Label the parent isotope and daughter isotope in Question 52.

54. Write a nuclear equation showing each of the following isotopes emitting an alpha particle.

a. platinum-180

$^{180}_{78}Pt \rightarrow {}^{4}_{2}He + {}^{176}_{76}Os$

b. bismuth-205

$^{205}_{83}Bi \rightarrow {}^{4}_{2}\alpha + {}^{201}_{81}Tl$

55. a. What are the symbols for alpha, beta, and gamma radiation?

$^{4}_{2}He$ or $^{4}_{2}\alpha$ $\quad {}^{0}_{-1}B$ or ${}^{0}_{-1}e$ $\quad {}^{0}_{0}\gamma$

b. Which is the most harmful and why?

Gamma rays due to their very high energy

c. Gamma radiation often accompanies the processes of: *Circle all that apply*

- i. alpha decay
- ii. beta decay
- iii. fission
- iv. fusion

56. The splitting apart of a nucleus is called fission. Where does this process occur? Nuclear Power Plant

57. The joining of nuclei to form a larger nucleus is called fusion. Where does this process occur? Sun

58. Suppose holmium-170 undergoes beta decay. The daughter isotope then also undergoes beta decay. What is the final product?

① $^{170}_{67}Ho \rightarrow {}^{0}_{-1}B + {}^{170}_{68}Er$

② $^{170}_{68}Er \rightarrow {}^{0}_{-1}B + {}^{170}_{69}Tm$ ← Final Product

59. The only way to change one element into another is to change the number of protons in the nucleus.